12AY7

TWIN TRIODE

FOR LOW-LEVEL AMPLIFIER APPLICATIONS

DESCRIPTION AND RATING

The 12AY7 is a miniature medium-mu twin triode designed primarily for use in low-level stages of high-gain audio-frequency amplifiers. The tube is specially designed to exhibit low noise and low microphonic output. In addition, hiss and hum output voltages are controlled to limits consistent with the requirements of low-level amplifier applications.

GENERAL

ELECTRICAL

	Series	Parallel	
Cathode—Coated Unipotential			
Heater Voltage, AC or DC	12.6	6.3	Volts
Heater Current	0.15	0.3	Amperes
Direct Interelectrode Capacitances*			
Grid to Plate: (g to p), Each Section		1.3	pf
Input: g to (h+k), Each Section		1.3	pf
Output: p to (h+k), Each Section		0.6	pf

MECHANICAL

Mounting Position—Any
Envelope—T-6½, Glass
Base—E9-1, Small Button 9-Pin

MAXIMUM RATINGS

DESIGN-CENTER VALUES, Each Section

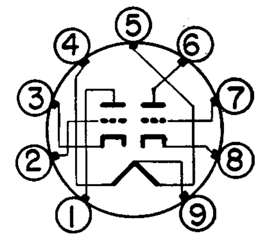
Plate Voltage	300	Volts
Plate Dissipation	1.5	Watts
DC Cathode Current	10	Milliamperes
Heater-Cathode Voltage		
Heater Positive with Respect to Cathode	90	Volts
Heater Negative with Respect to Cathode	90	Volts

Design-Center ratings are limiting values of operating and environmental conditions applicable to a bogey electron tube of a specified type as defined by its published data and should not be exceeded under normal conditions.

The tube manufacturer chooses these values to provide acceptable serviceability of the tube in average applications, making allowance for normal changes in operating conditions due to rated supply-voltage variation, equipment component variation, equipment control adjustment, load variation, signal variation, environmental conditions, and variations in the characteristics of the tube under consideration and of all other electron devices in the equipment.

The equipment manufacturer should design so that initially no design-center value for the intended service is exceeded with a bogey tube under normal operating conditions at the stated normal supply voltage.

BASING DIAGRAM

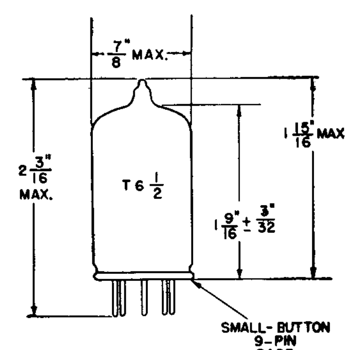


EIA 9A

TERMINAL CONNECTIONS

Pin 1—Plate (Section 2)
Pin 2—Grid (Section 2)
Pin 3—Cathode (Section 2)
Pin 4—Heater
Pin 5—Heater
Pin 6—Plate (Section 1)
Pin 7—Grid (Section 1)
Pin 8—Cathode (Section 1)
Pin 9—Heater Center Tap

PHYSICAL DIMENSIONS



EIA 6-2

CHARACTERISTICS AND TYPICAL OPERATION

CLASS A_1 AMPLIFIER, Each Section

Plate Voltage	250	Volts
Grid Voltage	−4.0	Volts
Amplification Factor	44	
Plate Resistance, approximate	25,000	Ohms
Transconductance	1750	Micromhos
Plate Current	3.0	Milliamperes
Grid Voltage, approximate		
Ib = 10 Microamperes	−8	Volts

LOW-LEVEL-AMPLIFIER SERVICE, Each Section

Heater Voltage†	6.3	Volts
Plate-Supply Voltage	150	Volts
Plate Load Resistor	20,000	Ohms
Grid Resistor	0.1	Megohms
Cathode Resistor	2700	Ohms
Cathode Capacitor	40	Microfarads
Voltage Gain	12.5	

* Without external shield.

† Pin 9 connected to negative B supply.

CLASS A RESISTANCE-COUPLED AMPLIFIER

EACH SECTION

LOW IMPEDANCE DRIVE (APPROXIMATELY 200 OHMS)

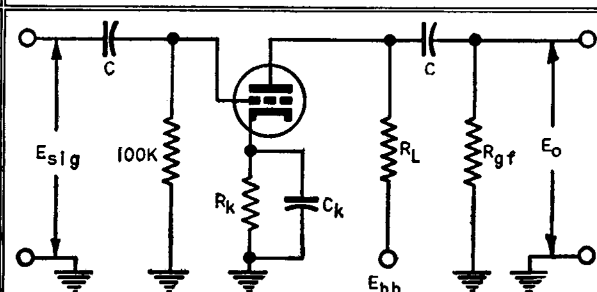
R_L	R_{gf}	Ebb = 90 Volts			Ebb = 180 Volts			Ebb = 300 Volts		
		R_k	E_o	Gain	R_k	E_o	Gain	R_k	E_o	Gain
0.10	0.10	1900	6.9	22	1300	18	25	1000	34	27
0.10	0.24	2100	9.6	25	1500	24	28	1300	45	29
0.24	0.24	4200	8.2	26	2700	20	28	2200	36	30
0.24	0.51	4800	11	27	3100	25	28	2700	45	31
0.51	0.51	8800	8.6	26	6000	20	29	4700	36	30
0.51	1.0	10000	11	27	7200	25	29	6000	45	31

Notes:

1. E_o is maximum RMS voltage output for approximately five percent total harmonic distortion.
2. Gain is measured for an output voltage of two volts RMS.
3. R_k is in ohms; R_L and R_{gf} are in megohms.
4. Coupling capacitors (C) should be selected to give desired frequency response. R_k should be adequately by-passed.

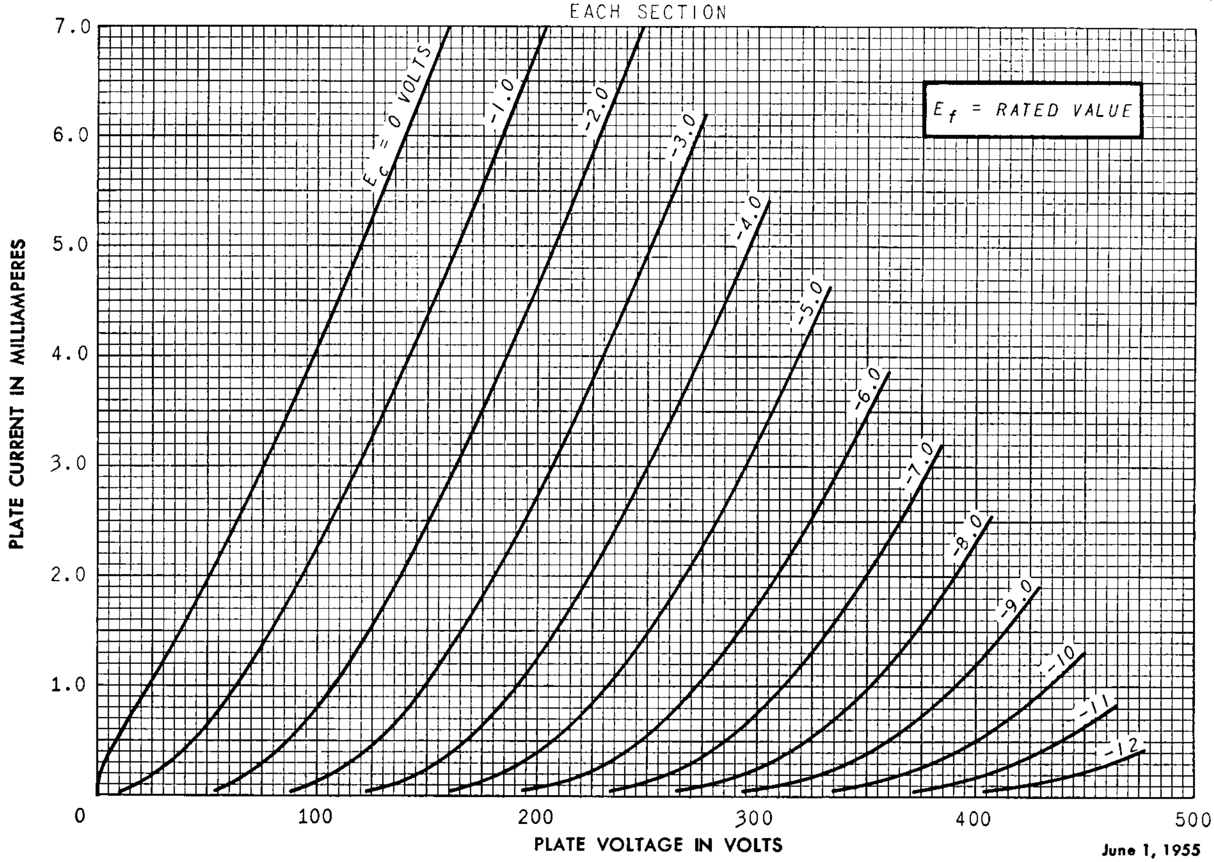
HIGH IMPEDANCE DRIVE (APPROXIMATELY 100K OHMS)

R_L	R_{gf}	Ebb = 90 Volts			Ebb = 180 Volts			Ebb = 300 Volts		
		R_k	E_o	Gain	R_k	E_o	Gain	R_k	E_o	Gain
0.10	0.10	2600	8.8	21	1600	20	24	1300	36	26
0.10	0.24	3000	12	23	1900	27	27	1600	48	28
0.24	0.24	5500	11	24	3500	24	27	2800	41	29
0.24	0.51	6200	13	25	4100	29	28	3400	51	30
0.51	0.51	11000	11	25	6800	25	28	5500	49	30
0.51	1.0	12000	14	26	8100	31	29	6700	54	30



AVERAGE PLATE CHARACTERISTICS

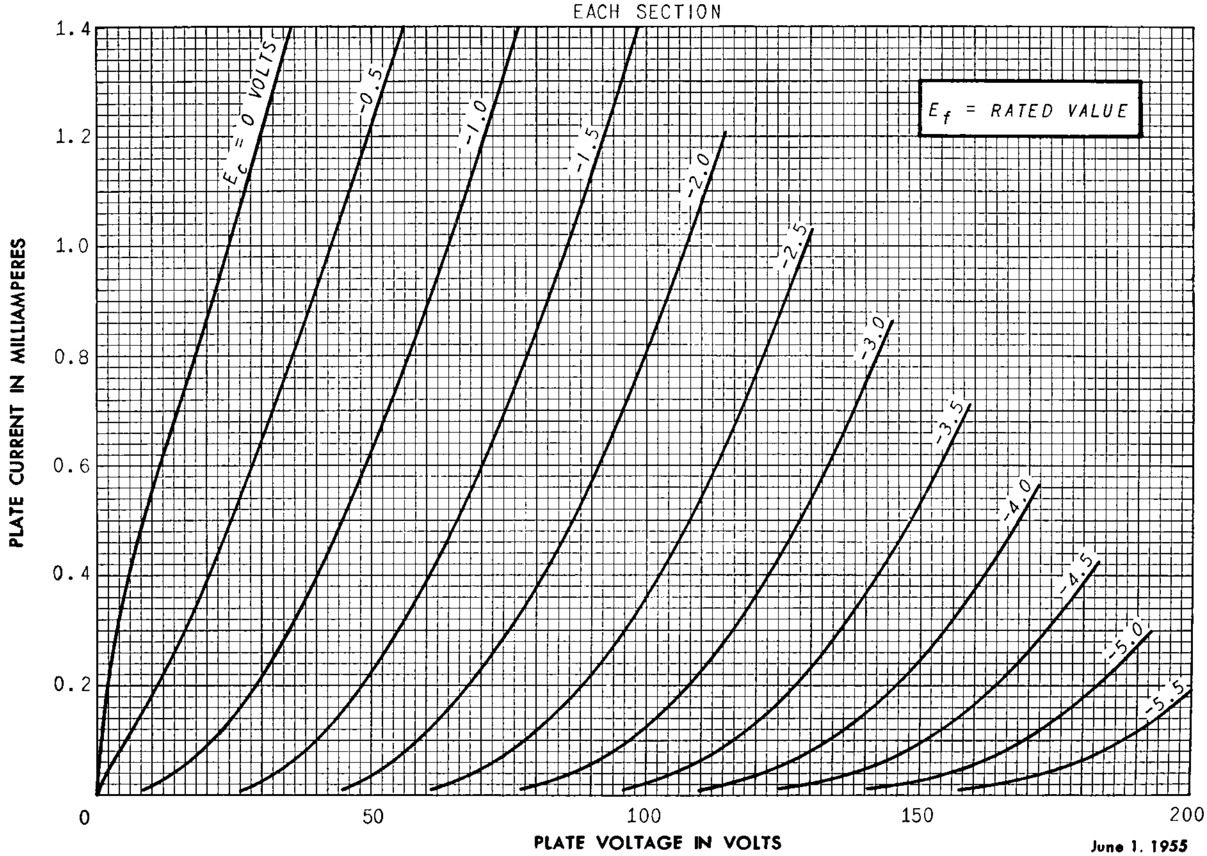
EACH SECTION



June 1, 1955

AVERAGE PLATE CHARACTERISTICS

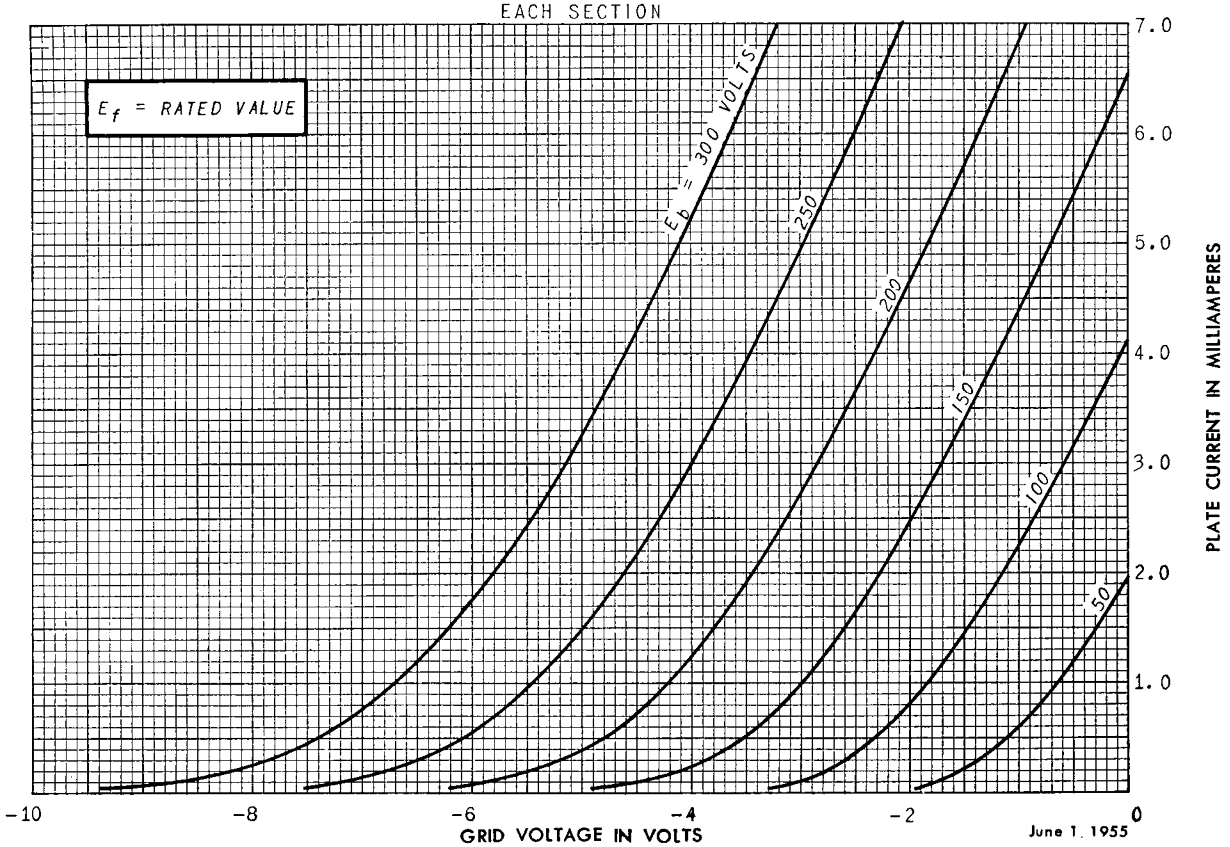
EACH SECTION



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AVERAGE TRANSFER CHARACTERISTICS

EACH SECTION



AVERAGE CHARACTERISTICS

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